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Section VI

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Stereoscopic Studies of Anatomy

Section VI

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Biology
GIFT

ABDOMEN.

VISCERA—No. 1.

STOMACH, LIVER, AND DUODENUM

(From a young subject.)

The STOMACH is seen to lie nearly horizontally, in the left hypochondriac and epigastric regions. The pyloric orifice lies near the mesial plane of the body, and its position is indicated by an annular constriction. From this point, the FIRST PART of the DUODENUM passes backwards, and comes into contact with the neck of the gall-bladder; the SECOND PART passes downwards, between the head of the pancreas and the hepatic flexure of the colon, and, in this specimen, in front of the right kidney; and the THIRD PART passes to the left and then upwards, in front of the body of the third lumbar vertebra.

The positions of the hepatic and splenic flexures of the colon should be noticed, lying far back, and in contact with their areas on the liver and spleen respectively.

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The figures indicate—

1. Body of the stomach.
2. Antrum pylori.
3. Pylorus.
4. First part of duodenum.
5. Ligamentum teres of the liver.
6. Gall bladder.
7. Hepatic flexure of the colon.
8. Right kidney.
9. Spleen.
10. Pancreas and superior mesenteric vessels, cut across.
11. Splenic flexure of colon.

ABDOMEN VISCERA No 1.
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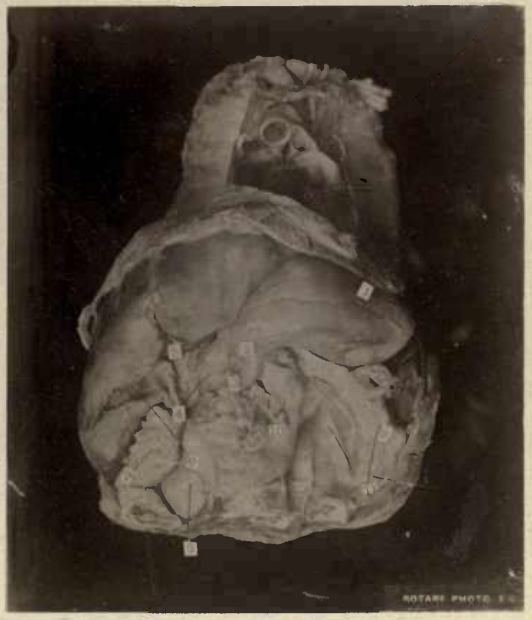

ABDOMEN.

VISCERA—No. 2.

THE STOMACH BED.

View of the last specimen after removal of the stomach.

The STOMACH lies in a chamber under cover of the left lobe of the liver and left cupola of the diaphragm, and this chamber is bounded by the gastric surface of the spleen, the left crus of the diaphragm, the left supra-renal capsule and a varying amount of the left kidney, the upper surface of the pancreas, the transverse mesocolon, and the transverse colon.

The transverse colon and mesocolon have been removed, leaving the splenic flexure in position, and showing the flattened upper surface of the pancreas. The left crus of the diaphragm lies above and internal to the left supra-renal body.

The second and third parts of the duodenum are seen as in the last view.

It will be noticed how close the termination of the duodenum lies to the under surface of the stomach, the transverse mesocolon alone intervening, and hence the intestine can easily be fixed to this surface of the stomach, as in the operation of posterior gastro-enterostomy.

The figures indicate—

1-5. Ligamentum teres of liver.
6. Gall bladder.
7. Hepatic flexure of the colon.
8. Right kidney.
9. Spleen.
10. Head of the pancreas and superior mesenteric vessels.
11. Splenic flexure of the colon.
12. Left crus of the diaphragm.

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ABDOMEN VISCERA. No. 2.
SECTION VI

ABDOMEN.

VISCERA.—No. 3.

THE STOMACH VIEWED FROM ABOVE AND SOMEWHAT IN FRONT.

The form and position of the stomach are greatly influenced by the amount of its distension, as well as by the condition of adjacent viscera. The specimen seen here is in a condition of considerable distension, and its general shape is that of a pyriform figure, somewhat bent upon itself.

The FUNDUS is the dilated portion lying to the left of the orifice of the œsophagus, rounded in outline, and extending upwards and backwards.

The PYLORIC portion is the narrow, somewhat cylindrical portion near the pyloric orifice, and the dilated part immediately to the left is the **antrum pylori**. The position of the **pyloric orifice** is indicated upon the surface by an annular constriction, and it should be noticed that in distension the antrum pylori lies to the right of the orifice.

The anterior or **upper surface** of the stomach is, in this condition, in contact with the under surface of the left lobe of the liver, the vault of the diaphragm, and the anterior abdominal wall.

The figures indicate—

1. Œsophageal opening.
2. Fundus.
3. Lesser curvature.
4. A projection, which passed from under the liver.
5. Antrum pylori.
6. Pyloric sphincter.

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ABDOMEN VISCERA No 3
SECTION VI.

ABDOMEN.

VISCERA—No. 4.

THE STOMACH VIEWED FROM BEHIND AND BELOW.

The inferior or posterior surface of the stomach, practically entirely invested by peritoneum, forms part of the anterior wall of the lesser peritoneal cavity, and is, therefore, separated by a double layer of peritoneum from the structures with which it is in immediate relation. The only exception is a small triangular area near the cardiac orifice which is in immediate contact with the diaphragm.

The remainder of this surface is in relation with the gastric surface of the spleen, the anterior surface of the left kidney and supra-renal capsule, the pancreas, transverse meso-colon and transverse colon.

The body of the pancreas where it is in front of the vertebral column, causes a marked indentation of this surface, situated near the lesser curvature.

The narrow character of the pyloric orifice should be noted, and also the acute angle which the termination of the oesophagus makes with the stomach.

The figures indicate—

1. Oesophagus.
2. Fundus.
3. Antrum.
4. Lesser curvature.
5. Greater curvature.
6. Pyloric orifice.
7. Pancreatic impression.
8. Impression for the transverse meso-colon.
9. Area for the terminal part of the pancreas.

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ABDOMEN.

VISCERA—No. 5.

ABDOMINAL PORTION OF THE OESOPHAGUS AND PART OF THE LIVER-BED.

(From the same subject as Abdominal Cavity, Nos. 5 and 6.)

The liver has been removed.

The *intra-abdominal portion* of the oesophagus is short, and is seen to join the stomach so as to form with it an acute angle, which is rather exaggerated in this specimen.

This portion of the oesophagus lies in contact with the posterior surface of the liver, and is accompanied by the pneumogastric or vagi nerves, the left one lying in front and the right behind.

The figures indicate—

1. Oesophagus and left vagus nerve.
2. Right crus of the diaphragm.
3. Two pointers inserted into the cut ends of the inferior vena cava.
4. Points to the divided portal vein, as it emerges from the pancreas. The duodenum has been displaced downwards.

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ABDOMEN.

VISCERA—No. 6.

SPLEEN, PANCREAS, KIDNEY, AND UNDER SURFACE OF THE STOMACH, FROM THE LEFT SIDE AND BELOW.

The tail of the pancreas passes across the front of the left kidney towards the spleen, below the under surface of the stomach. The splenic vessels accompany it, and are seen entering the spleen at the hilum.

The stomach here is empty, and comes into contact with only a small portion of the gastric surface of the spleen, the remainder of that surface was in contact with the splenic flexure of the colon.

The kidney is seen to be related in front to the pancreas and spleen, while the branches of the inferior mesenteric artery cross in front of it, and, with the peritoneum, separated it from the small intestine.

The descending colon passes downwards along its outer border.

The anterior margin of the spleen shows a distinct notch.

The figures indicate—

1. Under surface of the stomach.
2. Splenic vessels.
3. Tail of pancreas.
4. Upper part of left kidney.
5. A portion of the phrenico-colic peritoneal ligament, supporting the spleen.
7. The seventh rib.

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ABDOMEN VISCERA No 6
SECTION VI.

ABDOMEN.

VISCERA—No. 7.

The *head* of the pancreas lies in the hollow formed by the descending and transverse parts of the duodenum. The superior mesenteric vessels lie in a notch in it, and the portion below this notch is the *uncinate process.* The *head* is in relation, above, with the body of the gland, the pyloric region of the stomach, and the first part of the duodenum, and it lies in front of the bodies of the first and second lumbar vertebræ, from which it is separated by the aorta, inferior vena cava, and part of the diaphragm. The pancreatico-duodenal vessels ramify on its surface and between it and the duodenum. The portal vein is formed in front of it, and the common bile duct passes down behind it.

The *body of the pancreas* is somewhat triangular in shape. The anterior surface is curved to receive the posterior surface of the stomach, and the posterior surface rests on the posterior abdominal wall with the splenic vein intervening, while the inferior surface is in contact with the duodeno-jejunal flexure, and the colon. The *tail* of the organ passes to the spleen.

Relation to peritoneum.—The anterior and inferior surfaces are covered by peritoneum, and the root of the transverse colon crosses the head and lies along the lower border of the body, while the root of the mesentery commences at the lower part of the head, thus creating a small area destitute of peritoneum.

The figures indicate—

1. Gastro-epiploic artery, and first part of the duodenum.
2. Second part of the duodenum.
3. Third part of the duodenum.
4. Duodeno-jejunal flexure.
5. Inferior pancreatico-duodenal vessels.
6. Superior mesenteric vessels.
7. Tail of the pancreas.
8. Spleen.
9. Left kidney.
10. Under surface of stomach (empty).
11. Inferior mesenteric vessels.
12. Descending colon.

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ABDOMEN VISCERA. No. 7.
SECTION VI.

ABDOMEN.

VISCERA—No. 8.

DUODENUM, PANCREAS, AND BILE-DUCTS.

The greater part of the head of the pancreas has been removed, so as to show the terminal part of the common bile-duct.

The second and third parts of the duodenum are seen forming a loop, in which the head of the pancreas lay, and terminating at the duodeno-jejunal flexure.

The superior mesenteric vessels have been cut across as they emerged from the pancreas, and the superior pancreatico-duodenal and right gastro-epiploic arteries are seen to their right side. The *common bile-duct* is seen posteriorly, running along the side of the duodenum and terminating by piercing its walls at the end of the second part. This duct was joined by the principal pancreatic duct, shortly before entering the wall of the duodenum; but, as is occasionally found, there is an accessory duct from the pancreas in this case, which terminates in the duodenum a little above this point. The inferior vena cava is seen lying in a still more posterior plane.

The figures indicate—

1. Second part of the duodenum.
2. Common bile-duct.
3. Inferior vena cava.
4. Ascending part of duodenum.
5. Superior mesenteric vein, with the artery on its left side.

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ABDOMEN.

ABDOMINAL VISCERA—No. 9.

THE LIVER VIEWED FROM ABOVE.

The parietal surface of the liver, in contact with the diaphragm, is divided into right and left lobes by the attachment of the **falciform ligament**, a double fold of peritoneum which runs upwards on this surface and then divides into two parts.

The lateral parts of this surface are convex, and are in relation to the base of the lung on each side, while the central part is flat and is related to the heart and pericardium.

The posterior part seen in this view is directed backwards, and forms the **posterior surface** of the organ.

The diverging limbs of the falciform ligament form, on the right, the upper layer of the coronary ligament, and, on the left the upper layer of the left lateral ligament. The **coronary ligament**, consisting of an upper and a lower layer, encloses the bare area of the liver, a surface destitute of peritoneal covering in contact with the under surface of the diaphragm. The meeting of the two layers to the right forms the small **right lateral ligament.**

On the posterior surface are seen, from left to right, the groove for the oesophagus, the Spigelian lobe, the groove for the inferior vena cava, and the bare area, with a portion of the surface for the right suprarenal body.

In the lumen of the inferior vena cava are seen some orifices of the **hepatic veins**, by which the blood is returned from the liver.

The figures indicate—

1. Upper end of the falciform ligament.
2. Upper layer of the coronary ligament.
3. Left layer of falciform ligament going to form the
4. Left lateral ligament.
5. Bare area.
6. Lumen of inferior vena cava.
7. Spigelian lobule.
8. Oesophageal groove

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ABDOMEN.

VISCERA—No. 10.

THE LIVER VIEWED FROM BEHIND AND BELOW.

This view shows the visceral or inferior surface, and the back part of the parietal surface.

The *inferior surface* of the liver is divided into a right and a left portion by the umbilical fissure and by the fissure for the ductus venosus. To the left of this line is the *left lobe*, on which is seen an impression for the upper surface of the stomach and an elevation called the *tuber omentale*, in contact with the lesser omentum.

The portion lying to the right of the umbilical fissure is subdivided by the *fossa for the gall-bladder* into two portions. To the left of the gall bladder, lies the *quadrate lobe* in contact with the pylorus, and, in this specimen, greatly indented by the colon in front, while the area to the right shows a *colic*, a renal, and a duodenal impression, indicated by numbers. Behind the *transverse fissure* lie the *caudate lobe* and the Spigelian lobe. This fissure is a transverse cleft, by which the hepatic artery, portal vein, and the hepatic plexus of nerves enter, and the hepatic ducts and lymphatic vessels leave the liver.

An enlarged lymphatic gland is seen, which is liable to exercise pressure upon these structures.

The *posterior part* of the *parietal surface* shows on the right, a portion of the bare area, and to the left of this, are seen the supra-renal impression, the fossa lodging the inferior vena cava, the Spigelian lobe, and the groove for the oesophagus.

The figures indicate—

1. Tuber omentale.
2. Gastric area.
3. Quadrate lobe.
4. Fossa for duodenum.
5. Renal surface.
6. Colic area.
7. Supra-renal surface.
8. Spigelian lobe.
9. Hepatic artery.
10. Portal vein.
11. Bile duct.
12. Inferior vena cava.

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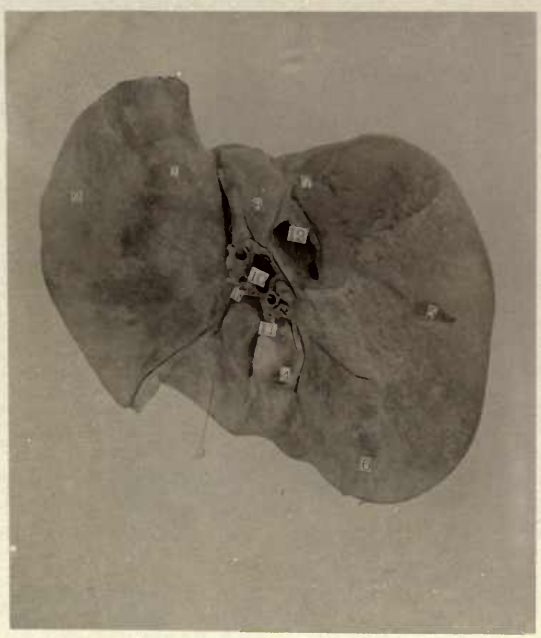

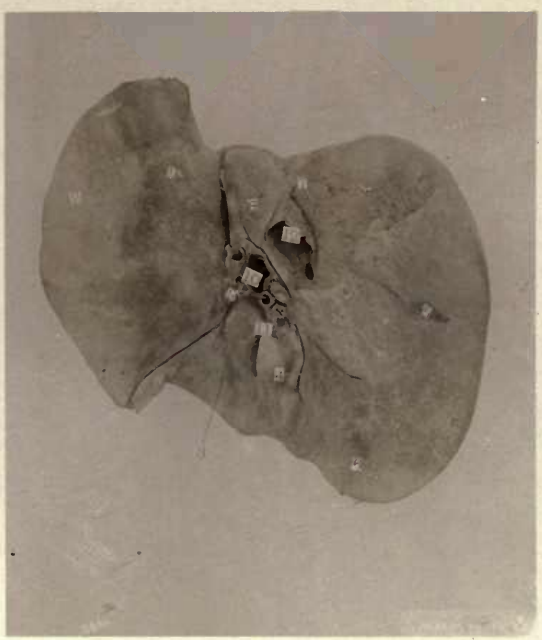

ABDOMEN.

VISCERA—No. 11.

THE LIVER BED.

The liver has been removed, to show its relations.

The liver occupies a chamber, under cover of the diaphragm, in the right hypochondriac and epigastric regions.

The stomach, pylorus and first part of duodenum form the lower boundaries on the left side.

The diaphragm, right supra-renal capsule, right kidney and the hepatic flexure (removed) compose the other walls.

The figures indicate—

1. Right inferior phrenic vessels.
2. Impression for Spigelian lobe of liver.
3. Right supra-renal.
4. Cut end of inferior vena cava.
5. Upper end of right kidney.
6. Posterior part of diaphragm.

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ABDOMEN.

VISCERA—No. 12.

TWO SPLEENS, VIEWED FROM THE FRONT.

The shape of the spleen is largely determined by the condition of distension of adjacent organs, and especially of the stomach and splenic flexure of the colon, and also by the state of the organ itself, whether it is distended or contracted.

The two specimens figured here illustrate two different forms which it may assume. The spleen on the right is elongated, and was in contact with a stomach in a state of distension, while that on the left is a more usual form, and was in relation to a stomach practically empty.

The **visceral surface** which is shown here, is divided into three areas by three borders which radiate from a blunted eminence called the internal basal angle. Of these areas, the **gastric surface**, which is the largest, is concave and lies in contact with the fundus of the stomach. On this surface is an elongated slit, called the **hilum**, by which the nerves and vessels enter the substance of the spleen. Behind the lower part of the hilum, is a small surface for the tail of the **pancreas.**

The **renal surface** lies to the back, and is flat. The remaining surface, called the **basal surface,** is related to the **splenic flexure** of the colon, and the **costo-colic ligament.**

The **anterior border** is notched in a characteristic manner.

The figures indicate—

1. Anterior margin.
2. Gastric surface.
3. Intermediate border.
4. Renal surface.
5. Basal surface.
6. Splenic vessels, entering at the hilum.
7. Anterior basal angle.
8. Pancreatic surfaces.

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ABDOMEN.

VISCERA—No. 13.

CAECUM.

Interior of the caecum in situ from the front.

The caecum lies in the right iliac fossa, immediately above the outer half of Poupart's ligament. The terminal part of the ileum opens on its inner and posterior aspect about two and a half inches above its lower end, and the vermiform appendix opens a short distance lower down. The caecum is usually completely invested by peritoneum, and lies upon the right ilio-psoas muscle.

The *ilio-caecal valve* is formed by the invagination of a portion of the ileum into the cavity of the large intestine. The orifice therefor comes to lie at the top of a double fold of the wall, the upper fold being horizontal and the lower more or less vertical, with a horizontal slit between them. From these folds two bands pass off, called *retinacula*, and extend round a considerable portion of the interior of the caecum.

The valve so formed is usually competent.

The vermiform appendix is here seen lying to the upper and inner side of the caecum, and bent upon itself at an acute angle, while the terminal part of the ileum is in this specimen at a higher level than usual, having been displaced upwards by the distended pelvic colon.

The figures indicate—

1. Terminal part of ileum.
2. Ilio-caecal aperture.
3. Aperture of the vermiform appendix
4. Vermiform appendix.

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ABDOMEN.

VISCERA—No. 14.

MUCOUS MEMBRANE OF THE INTESTINE.

The character of the mucous membrane of the alimentary canal presents marked differences in different portions.

In the upper part of the jejunum, the wall of the intestine is thick and fleshy, the inner surface is velvety, from the presence of villi, and shows numerous well-defined transverse ridges, called valvulae conniventes.

Further down, these characters become less distinct, until, near the end of the ileum, the coats are thinned, the ridges are few and irregular, and the diameter is diminished.

In this region may be seen the characteristic Peyer's patches, which are oval masses of lymphoid tissue, situated opposite the mesenteric attachment, and with the long axis lying along the line of the intestine. One of these is seen on an elevation in fig. 3.

The large intestine shows irregular sacculations, and the surface is smoother, as there are no villi.

Appendices epiploicae project from the peritoneal surface, and are merely small pads of fat covered by peritoneum.

The pieces of intestine shown are:—

1. Upper end of jejunum.
2. Middle of small intestine.
3. Lower end of ileum.
4. Large intestine.

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ABDOMEN VISCERA. No. 14.

SECTION VI.

ABDOMEN.

VISCERA.—No. 15.

KIDNEYS VIEWED FROM THE FRONT, THE UPPER PAIR FROM A YOUNG SUBJECT, THE LOWER FROM AN ADULT.

The shape of the kidneys is characteristic, and each possesses an upper and a lower pole, two surfaces, and two borders.

The upper pole is broad but thin, and lies nearer the middle line than the lower, which is narrower but thick. The outer border is convex, and on the inner border is an oblong fossa, the hilum, in which the ureter and the blood-vessels are lodged.

The middle part of the anterior surface is raised up so that this part of the kidney is thick, and the surface slopes away towards each pole, forming two planes of pressure.

In contact with the upper plane of the right kidney is the liver, and with the lower the colon, while the duodenum lies in front of a variable area near the hilum.

The left kidney, on the other hand, is in contact above with the stomach, spleen, pancreas, and suprarenal capsule, while below it is in contact with the coils of intestines, and the descending colon lies along its outer border.

The figures indicate—

1. Hepatic area.
2. Duodenal area.
3. Colic area.
4. Splenic area.
5. Pancreatic area.
6. Intestinal area.

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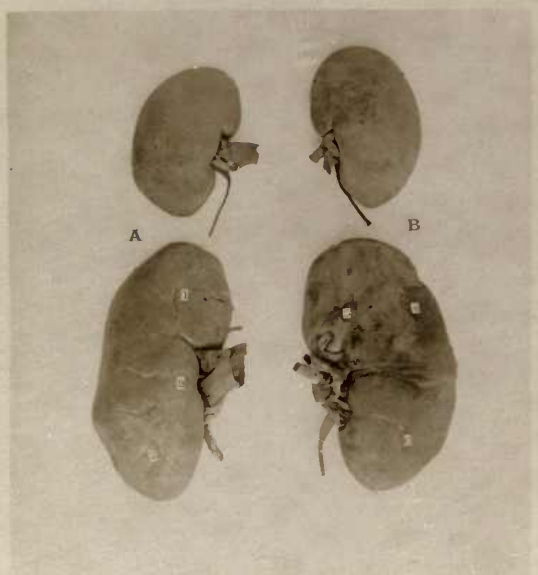

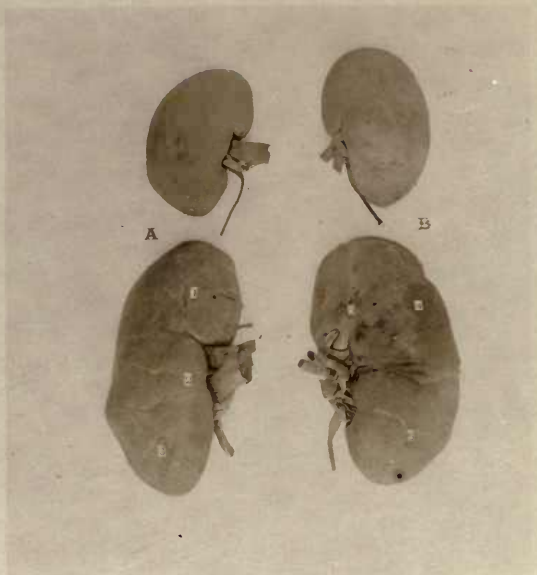

ABDOMEN.

VISCERA—No. 16.

KIDNEYS VIEWED FROM BEHIND, THE UPPER PAIR FROM A YOUNG SUBJECT, THE LOWER FROM AN ADULT.

The posterior surface of each kidney fits into an angular hollow by the side of the spine, and presents therefore a distinct vertical border which lies in the apex of this angle and divides the surface into an inner and an outer part.

The inner portion, which is narrow, is in apposition with the psoas muscle and the crus of the diaphragm, while the outer, directed backwards, rests against the diaphragm in its upper third, and the quadratus lumborum and the tendon of the transversalis in its lower two-thirds.

The posterior surface may also show a groove for the last rib, and dimples corresponding to the transverse processes of the first, second and third lumbar vertebræ, as well as a groove for the ligamentum arcuatum externum.

A *indicates the left kidneys and* B *the right, and in each—*

1 is the outer area of the posterior surface.

2 is the inner area of the posterior surface.

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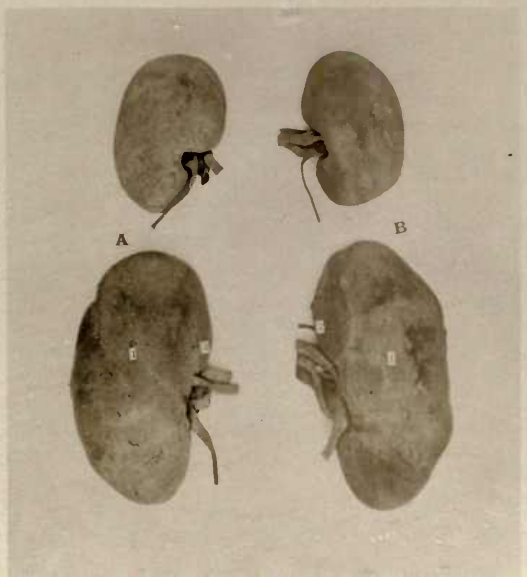

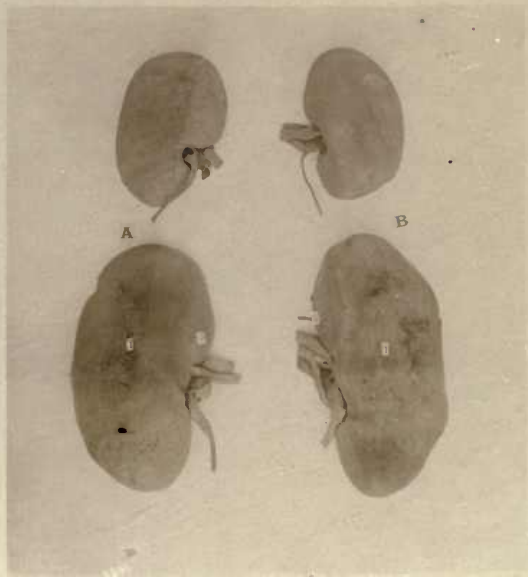

ABDOMEN.

VISCERA—No. 17.

INNER BORDER OF THE RIGHT KIDNEY, VIEWED FROM THE INNER SIDE.

The *hilum* on the inner border of the kidney is bounded by two convex margins, irregular in outline and variable as regards their relative size.

In the hilum are lodged the branches of the renal vein and artery and the ureter, in that order from before backwards.

The *hilum* leads into a slit, called the *renal sinus*, in which lies the *pelvis* of the kidney.

As not infrequently happens, in this specimen there are several renal arteries, each accompanied by a vein.

An inferior capsular vessel is seen going to the suprarenal capsule, which lies mainly on the inner border of the kidney, a short distance above the hilum.

The figures indicate—

1. Suprarenal capsule.
2. Principal renal vein.
3. A renal artery, branching at the hilum.
4. Ureter, accompanied by an artery.
5. Anterior lip of the hilum.
6. Posterior lip of the hilum.

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ABDOMEN VISCERA. No. 17.
SECTION VI.

ABDOMEN.

VISCERA—No. 18.

SUPRARENAL CAPSULES, VIEWED FROM THE FRONT.

The suprarenal bodies are two small flattened ductless glands, closely related to the kidneys.

The *right*, somewhat triangular in shape, rests more upon the upper pole of the right kidney, and lies between the liver and that part of the diaphragm which covers the side of the spine.

The lower part of its anterior surface is covered by peritoneum, and the upper part is in contact with the liver externally and the inferior vena cava internally.

Near the apex is a small hilum, from which emerges a small vein which goes to join the inferior vena cava.

The *left capsule* is rather sickle-shaped, and lies more on the mesial border of its kidney. The upper part of the anterior surface is covered by the peritoneum forming the posterior wall of the lesser sac, and is related to the cardiac portion of the stomach, while the lower portion is in direct contact with the splenic vessels and the pancreas. The hilum is here situated near the lower end, and transmits a large vein, which goes to the left renal vein.

A *indicates the right suprarenal and* B *the left, and the figures indicate—*

1. The hilum.
2. Surface in contact with the inferior vena cava.
3. Peritoneal area of right capsule.
4. Surface in contact with the liver.

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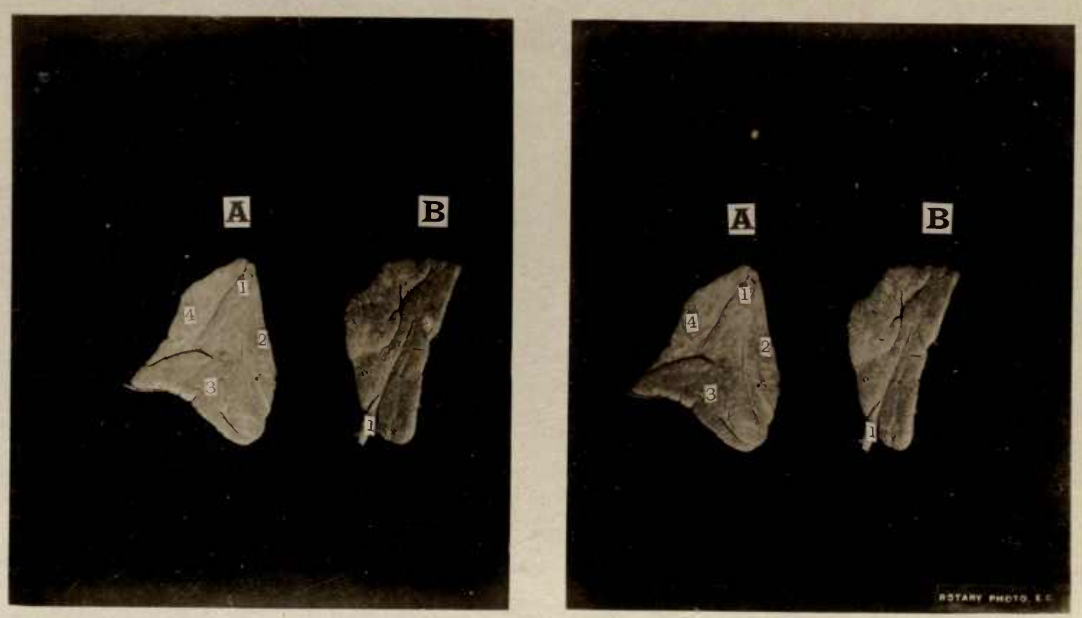

ABDOMEN VISCERA. No. 18.

SECTION VI.

ABDOMEN.

VISCERA—No. 19.

THE SUPRARENAL CAPSULES, VIEWED FROM BEHIND.

The posterior surface of the suprarenal capsules is in each divided into two parts, by a fairly prominent ridge.

The outer and lower portion is in contact with the kidneys, and this is due to the fact that the capsule on each side rests rather on the anterior surface than on the border of the kidney.

The remaining portion of this surface is in contact with the corresponding crus of the diaphragm. There is usually a considerable amount of fat surrounding the capsules.

A is the right suprarenal and B the left, and in each the figures indicate—

1. Surface in contact with the kidney.
2. Surface in contact with diaphragm.

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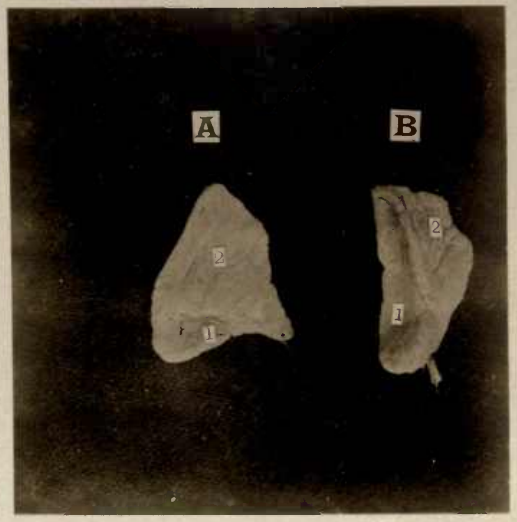

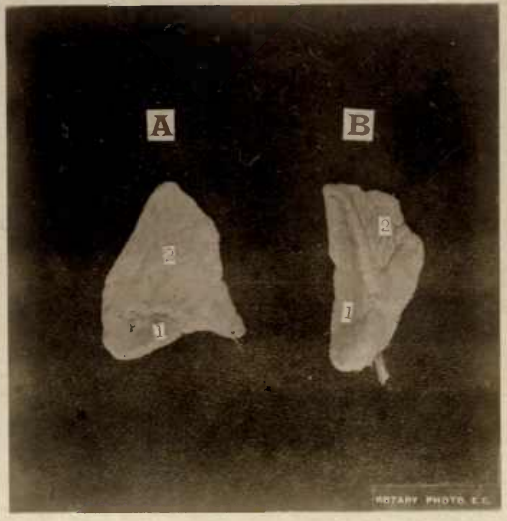

ABDOMEN.

VISCERA—No. 20.

PANCREAS, BILE-DUCT AND DUCT OF PANCREAS, AND DUODENUM, VIEWED FROM BEHIND.

A shows the interior of the duodenum. A probe has been passed along the common bile-duct, and the orifice is seen to lie on the summit of a papilla.

In B, the common bile-duct is seen passing downwards behind the head of the pancreas, and is joined by the duct of the pancreas. In relation to the pancreas are seen, the origin of the *coeliac axis* artery which lies at its upper border, the *hepatic artery* passing from thence to the right and the *splenic artery* to the left along the upper border of the pancreas, the *superior mesenteric* artery and vein, and the *portal vein.*

The figures indicate—

1. Descending part of the duodenum.
2. Duodeno-jejunal flexure.
3. Head of pancreas and pancreatic duct.
4. Common bile-duct.
5. Portal vein.
6. Coeliac axis artery.
7. Splenic artery.
8. Superior mesenteric artery.
9. Splenic vein.
10. Tail of pancreas.
11. Superior pancreatico-duodenal artery.

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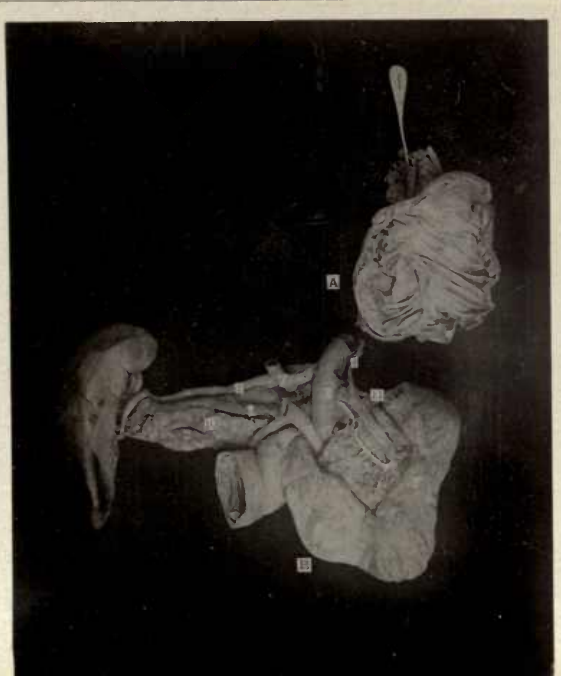

ABDOMEN—VISCERA. No. 20.
SECTION VI.

ABDOMEN.

VISCERA—No. 21.

PANCREATIC AND COMMON BILE-DUCTS, SEEN FROM THE FRONT.

The ducts have been exposed by removing the greater part of the head of the pancreas, and cutting away a portion of the anterior surface of the body of the gland. The superior mesenteric vessels have also been removed.

The main *duct of the pancreas* or *canal of Wirsung* begins at the tail of the gland and passes along in the substance of the gland to the right. It is joined by numerous small ducts which come from the differents lobules, the majority of them entering it at a right angle. Within the head of the pancreas, the duct bends downwards, lies by the side of the common bile-duct, and ends by piercing its wall and thus entering the second part of the duodenum with it. There is frequently a small accessory duct which arises in the head of the gland and enters the duodenum at a higher level independently.

The manner in which the splenic vessels enter the spleen along an elongated slit-like fissure the hilum, should be noticed.

The figures indicate:—

1. Formation of the common bile-duct.
2. Duct of the pancreas in the neck of the gland.
3. Lower part of the head of the pancreas.
4. Descending part of the duodenum.
5. Body of the pancreas.
6. Gastro-duodenal artery.
7. Splenic artery.
8. Splenic vein.
9. Hepatic artery.
10. Coeliac axis artery.

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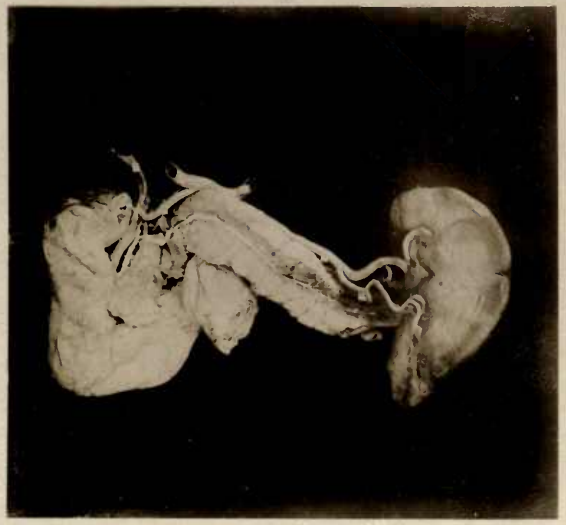
SECTION VI.



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PELVIS.

MALE PERINEUM.—No. 1.

THE SKIN AND FASCIA HAVE BEEN REMOVED FROM THE ANTERIOR HALF OF THE PERINEUM, AND THE ISCHIO-RECTAL FOSSA HAS BEEN CLEANED OUT.

The **perineal space** may be divided conveniently into two portions by a line drawn transversely across it between the anterior parts of the ischial tuberosities. The anterior portion of the space, called the urogenital triangle, is shown in this view, while the posterior part contains the ischio-rectal fossæ and the anus.

The urogenital triangle is bounded laterally by the rami of the pubis and ischium, and contains the root of the penis and the muscles, nerves and blood-vessels associated with it.

A layer of strong fibrous tissue, which is a deep portion of the superficial fascia of this region called the fascia of Colles, forms a roof for the space, under cover of the skin, and of some fatty tissue.

This layer is attached to the margin of the pubic arch on each side (12) and to the base of the triangular ligament (see No. 3) behind, while in front it is continuous with one of the layers, the tunica dartos, of the scrotum. Under cover of it lie the bulb and crura of the penis, with their muscles, resting on the triangular ligament.

The space thus covered in is bounded deeply by the triangular ligament, and into it urine may be extravasated in cases of rupture of the spongy portion of the urethra. In such cases, the spread of the fluid is limited on all sides except in front, where it may pass into the tissues of the scrotum, under the tunica dartos, to the penis and anterior abdominal wall, under the deep layer of the superficial fascia.

The muscles are (1) the ejaculator urinæ, which arises from the central point of the perineum, from the triangular ligament, and from a mesial raphe. It invests the bulb, the corpus spongiosum and part of the penis, (2) the **erector penis** on each side, arises from the inner aspect of the ischial tuberosity, invests the crus, and is inserted into its anterior part. (3) The **transversus perinei**, a small transverse muscle (see No. 2).

The **nerves** are the anterior and posterior superficial perineal nerves, branches of the perineal nerve. They appear in the posterior part of the triangle, run forwards and supply the scrotum, joining with the long pudendal branch of the small sciatic nerve. The nerves are accompanied by superficial perineal vessels, from the internal pudic.

The figures indicate—

1. Tuber ischii.
2. Sphincter ani externus.
3. Superficial perineal nerves.
4. Superficial perineal artery.
5. Inferior hæmorrhoidal vessels and nerve.
6. Ejaculator urinæ covering the bulb.
7. Crus penis, covered by erector penis.
8. Transversus perinei muscle.
9. Bulb.
10. Urethra, divided in corpus spongiosum.
11. Corpora cavernosa.
12. Fascia of Colles.

MALE PERINEUM. No. 1
SECTION VI

PELVIS.

MALE PERINEUM.—No. 2.

IN ADDITION TO THE PREVIOUS DISSECTION, THE ROOT OF THE PENIS HAS BEEN EXPOSED BY THE REMOVAL OF THE EJACULATOR URINÆ FROM THE SURFACE OF THE BULB, AND OF THE ERECTOR PENIS FROM THE CRUS PENIS.

The cut surface of the body of the penis shows that that organ is made up of two corpora cavernosa lying side by side dorsally, and of a corpus spongiosum which contains the urethra, lying ventrally. At the root of the penis these three portions separate from one another and diverge, the corpus spongiosum being continued back into the bulb, while the corpora cavernosa become continued into the crura, which lie on the sides of the pubic arch, to which they are attached. These three structures rest upon the triangular ligament.

The **bulb** is a rather cylindrical mass of spongy tissue, which enlarges as it passes back, and is sometimes notched at its extremity.

The **crura** are more irregular in shape, being flattened for attachment to the pubic arch and tapering away in front. They are also composed of cavernous tissue, and have a strong fibrous capsule.

The **transversus perinei** is a small muscle, arising from the inner aspect of the ascending ramus of the ischium, and inserted into the central point of the perineum. This muscle is often pierced by the superficial perineal nerves and vessels in their course to the surface.

The figures indicate:—

1. Ramus of Ischium.
2. Bulb.
3. Erector penis (divided).
4. Crus penis.
5. Triangular ligament.
6. Transversus perinei.
7. Superficial perineal nerves and vessels.
8. External sphincter of anus.
9. Corpora cavernosa.
10. Urethra in corpus spongiosum.

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PELVIS.

MALE PERINEUM—No. 3.

THE TRIANGULAR LIGAMENT AND STRUCTURES PIERCING IT.

The bulb and crura have been removed, and the urethra divided where it pierces the triangular ligament.

The **triangular ligament** consists of two layers, a superficial and a deep, of which the former, or true triangular ligament, is seen here.

It is a strong fibrous sheet which extends across the arch of the pubis from side to side, but does not reach up quite to the symphisis, and extends for some distance backwards towards the anterior portion of the ischial tuberosities.

The structures which form the root of the penis rest upon its superficial surface, and are attached to it. The crura are attached to the lateral portion, and the bulb is bound down in the centre by fascia.

The urethra passes through an aperture in the centre of the ligament, and some erectile tissue is continued from the bulb through the same opening, and at this point the artery to the bulb, which is under cover of the ligament, gains access to the bulb.

In front, the ligament is perforated by the internal pudic artery, and, in front of it, by the dorsal nerve of the penis on either side, while the dorsal vein passes through a small aperture between the triangular and the sub-pubic ligaments.

The superficial perineal nerves and vessels pierce the triangular ligament near its base, and the ducts of Cowper's glands pass through it in the wall of the urethra.

This region is the common site for rupture of the urethra, and it will be seen that extravasated urine is prevented from passing up into the pelvis by the triangular ligament.

The fluid cannot pass backwards or outwards, as the fascia of Collis is attached to the base of the ligament and to the margins of the pubic arch, and it must therefore pass forwards into the scrotum.

The figures indicate—

1. External sphincter ani.
2. Triangular ligament.
3. Attachment of bulb.
4. Urethra.
5. Dorsal vein of the penis.
6. Internal pudic artery perforating the ligament, and giving off an artery to the corpus cavernosum, and becoming dorsal artery of the penis.
7. Dorsal nerve of penis.
8. Branch of perineal nerve to muscles, running inwards behind the base of the triangular ligament.

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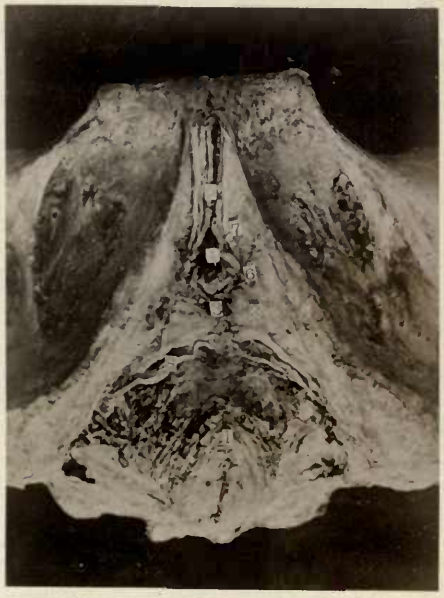

ROTARY PHOTO.

PELVIS.

MALE PERINEUM—No. 4.

STRUCTURES BETWEEN THE LAYERS OF THE TRIANGULAR LIGAMENT.

The superficial, or true, triangular ligament has been removed. Under cover of the triangular ligament is a small triangular space containing the deep transversus perinei muscle, Cowper's glands, some nerves and vessels, and the membranous portion of the urethra.

The deep transversus perinei or compressor urethræ muscle consists of a number of muscle fibres which arise from the pubic arch at the junction of the ischial and pubic portions, pass inwards towards the mesial plane, and are inserted into a mesial raphé, enclosing the urethra, and acting as a voluntary sphincter muscle.

Cowper's glands are two small glandular structures which lie embedded in the muscle, one on each side, a short distance behind the urethra. The portion of the urethra in this region is called the membranous portion, and measures about half an inch in length. Traced inwards, the urethra passes through the deep layer of the triangular ligament, which is a portion of the pelvic fascia stretching across the pubic arch, and supporting the under part of the prostate gland.

This portion of the urethra is apt to be injured in accidents causing fracture of the pelvis, and the extravasated urine is limited by the margins of the space, and often passes deeply inwards.

At the sides the dorsal nerve of the penis and the internal pudic artery pass forwards. the latter giving off the artery to the bulb.

The figures indicate—

1. Urethra.
2. Cowper's gland.
3. Compressor urethræ.
4. Levator ani.
5. External sphincter.
6. Dorsal artery of penis.
7. Transverse perineal artery.
8. Dorsal artery and nerve of penis.
9. Dorsal vein of penis.
10. Prostate plexus of veins.

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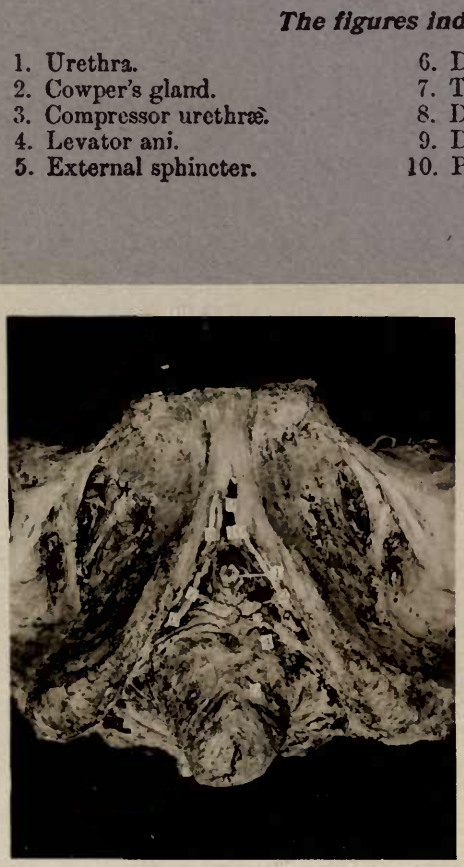
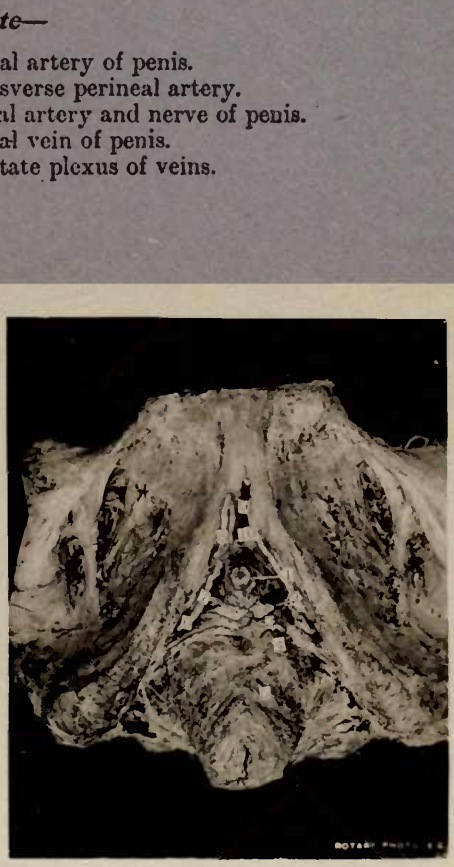
MALE PERINEUM. No. 4.





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PELVIS.

MALE PERINEUM—No. 5.

THE PROSTATE GLAND, FROM THE PERINEUM.

A portion of the pubic arch has been removed, with the structures related to it. The venous plexus surrounding the prostate has been removed from the left side.

The **levatores ani** muscles are seen passing from the back of the pubis as a sort of sling on which the prostate is supported.

The layers of fascia which invest each of the muscles on its pubic and perineal aspects meet with one another at the margin of the muscle, and are continued across to join the layer of the opposite side. The layer so formed is closely associated with the under aspect of the prostate gland, and forms the under portion of its sheath. A large plexus of veins, the prostatic plexus, lies between this sheath and the capsule of the gland, and this layer forms the deep triangular ligament.

In front, the fascia forms two strong bands which pass to the back of the pubis, and are called the pubo-prostatic ligaments.

The anterior margins of the levator ani meet and decussate in the middle line between the prostate and the anal canal, and in the interval between the prostate and the rectum there is a muscle bundle, variable in size, passing from the front of the rectum to the back of the urethra, the pre-rectalis muscle. It is seen here, divided.

The obturator internus muscle has been divided vertically on each side. On its pelvic aspect this muscle is invested by a strong sheet of fascia, the parietal pelvic fascia.

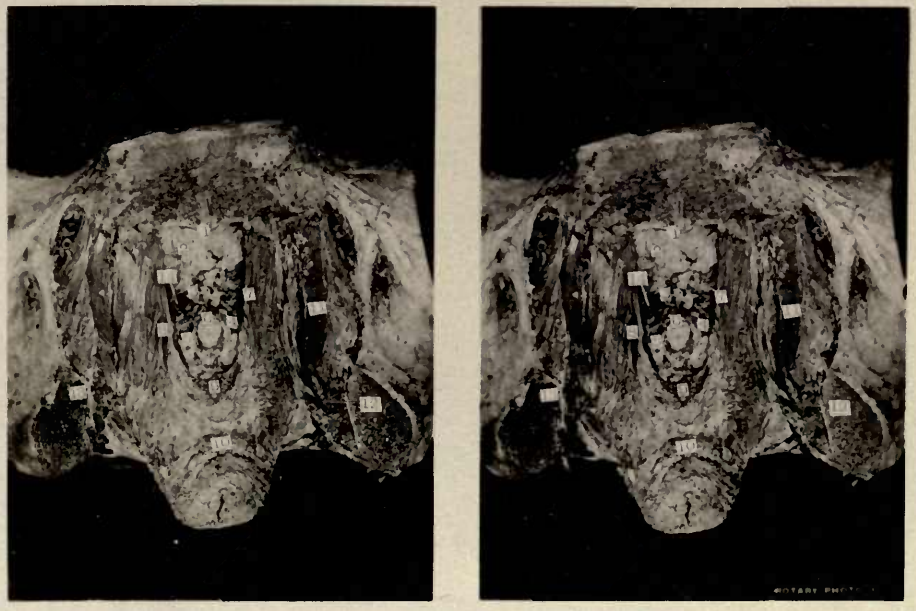
This fascia blends with the fascia covering the outer surface of the levator ani muscle along a line which forms the white line of the pelvic fascia, and corresponds to the apex of the ischio-rectal fossa.

Lower down, the internal pudic vessels and nerve run in a sheath formed by this fascia in the outer wall of the ischio-rectal fossa, called Alcock's canal.

The lumen of the urethra is, of course, seen to be merely a stellate fissure on the cut surface. The walls are of considerable thickness, and the portion seen is the termination of the membranous urethra, passing into the interior of the prostate gland.

The figures indicate:—

1. Symphisis pubis.
2. Bladder.
3. Pubo-prostatic bands (divided)
4. Prostate.
5. Capsule of prostate.
6. Urethra.
7. Levator ani.
8. Fascia (anal) of levator ani.
9. Prerectalis muscle (divided).
10. External sphincter
11. Obturator internus muscle.
12. Alcock's canal.
13. Ramus of ischium (divided).
14. Prostatic plexus of veins.



MALE PERINEUM. No. 5.

SECTION VI.

PELVIS.

FEMALE PERINEUM—No. 1.

THE SUPERFICIAL STRUCTURES HAVE BEEN REMOVED, DOWN TO THE LEVEL OF THE TRIANGULAR LIGAMENT, BUT LEAVING THE CLITORIS AND THE BULB AND CRUS CLITORIDIS ON THE RIGHT SIDE, AND THE ISCHIO-RECTAL FOSSA HAS BEEN CLEARED OUT, AND THE LEVATOR ANI EXPOSED.

The orifice of the vulva is seen to be quadrilateral or lozenge shaped, and the urethral orifice lies at the anterior angle on a slight elevation, while the aperture of the vagina is a transverse slit, somewhat concealed by two carunculæ. The anterior portion of the vulva has on each side the bulb, a large flattened mass of erectile tissue, wide behind but narrowing in front, while outside the posterior half of the vulva is seen a deep depression, in which lay a mass of large thin-walled veins.

This venous plexus lies near the anal canal, and communicates with the inferior hæmorrhoidal plexus, and is of importance in operations in this region. The crus clitoridis lies along the inner margin of the arch of the pelvis and is similar to the crus penis.

The anterior layer of the triangular ligament extends across the arch of the pelvis, as in the male, but is weakened by the large aperture in the centre for the vagina, and it did not extend back to the posterior end of the vaginal orifice.

The subject from which this preparation was made had been parous, and there may have been some tearing of the gynecological perineum, which has prolonged the vaginal aperture in a backward direction. Comparing this view with those of the male perineum, the clitoris and its crura are similar to the penis, while the bulb in the male is represented by the two bulbs of the vestibule.

There is, as it were, a division of the bulb into two halves, and the genital and urinary tracts open on the surface between them. The ejaculator urinæ muscles of the male is therefore represented by the sphincter vaginæ.

The figures indicate—

1. Central point of perineum.
2. Margin of vaginal orifice.
3. Caruncle.
4. Meatus urinarius.
5. Bulb of vestibule.
6. Crus clitoridis.
7. Triangular ligament.
8. Superficial perineal vessel divided.
9. Levator ani.
10. Clitoris.
11. Sphincter vaginæ divided.

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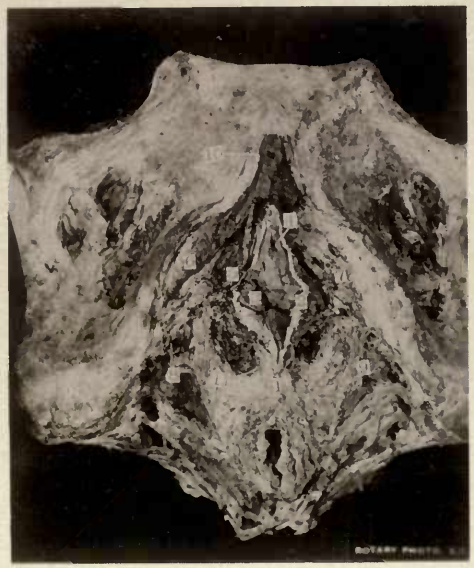

FEMALE PERINEUM. No. 1.

SECTION VI.

PELVIS.

FEMALE PERINEUM—No. 2.

IN ADDITION TO THE PREVIOUS DISSECTION, THE SUPERFICIAL LAYER OF THE TRIANGULAR LIGAMENT AND THE STRUCTURES SUPERFICIAL TO IT HAVE BEEN REMOVED, AND IN THE LEFT SIDE THE DEEP TRANSVERSUS PERINÆI MUSCLE HAS BEEN TAKEN AWAY, TO SHOW THE LEVATOR ANI MUSCLE.

The deep transversus perinæi arises as in the male (compressor urethræ) from the inner aspect of the pubic arch, and spreads out upon the surface of the urethra in front and the vagina behind.

The deep layer of the triangular ligament is formed in the same manner as in the male, and on its deep surface there is a large amount of very vascular tissue, which surrounds the upper part of the urethra and rests upon the anterior part of the levator ani, very much in the same position as the prostate in the male.

The dorsal nerve of the clitoris has been left on the left side, and is similar to the dorsal nerve of the penis in the male in its course and distribution. The accompanying vessels have been removed.

The figures indicate—

1. Central point of perineum.
2. Levator ani, anal fibres.
3. Levator ani, vaginal fibres.
4. Deep transversus perinæi.
5. Mass of vascular tissue.
6. Dorsal nerve of clitoris.
7. Meatus urinarius.
8. Veins of posterior vaginal plexus.
9. Dorsal artery of clitoris (divided).

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FEMALE PERINEUM. No. 2.
SECTION VI.

PELVIS.

FEMALE PERINEUM—No. 3.

THE PUBIC ARCH HAS BEEN REMOVED, WITH A PORTION OF THE PUBIC SYMPHISIS; PART OF THE OBTURATOR INTERNUS MUSCLE ON EACH SIDE HAS BEEN CUT AWAY, AND THE UPPER MARGIN OF THE LEVATORES ANI CUT SHORT.

The inferior surface of the bladder is seen, with the venous plexus which surrounds the neck, from which the urethra emerges.

The levator ani supports the neck of the bladder anteriorly,—some of its fibres are inserted, behind that, into the wall of the vagina, while still further back, the muscle on each side forms a thick rounded mass which passes down to the central point of the perineum, and to the anal canal.

The deep layer of the triangular ligament is formed by the fascia which invests the levator ani, passing across the middle line from the muscle of one side to that of the other.

The fascia on the outer, or parietal, aspect of the levator ani is thin and weak, but that on its inner, or pelvic, surface is of some strength.

The apex of the ischio-rectal fossa is seen, and the vessels which lie in the fascia forming the outer wall of the fossa—the internal pudic and dorsal artery of the clitoris—are seen divided.

The figures indicate—

1. Urinary bladder.
2. Levator ani.
3. Levator ani, anal fibres.
4. Levator ani, anterior fibres.
5. Obturator internus muscle.
6. Urethra.
7. Pubo-vesical ligaments.
8. Pelvic fascia.
9. Alcock's canal.
10. Vesical venous plexus.
11. Peri-urethral vascular tissue.

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ROTARY PHOTO. E.C.

PELVIS.

FEMALE PERINEUM.—No. 4.

THE SAME DISSECTION HAS BEEN CARRIED OUT AS IN NO. 3, AND A VIEW HAS BEEN TAKEN TO SHOW THE RELATION OF THE DEEPER PARTS TO THE PUBIC ARCH AND SYMPHYSIS.

The bladder in the female lies at a somewhat lower level in the pelvis than in the male, and the neck is situated on a plane which passes from the lower margin of the pubic symphysisin front backwards to the lower end of the sacrum.

Looked at from the front, the neck of the bladder lies just below the lower margin of the symphysis pubis.

The large venous plexus which lies behind the lower part of the symphysis is very liable to be injured in operations for division of the symphysis pubis. Hence it is preferable to make any division of the bone some distance to the side. The pubic arch in this specimen is a particularly good specimen of the wide female pubic angle.

The figures indicate—

1. Urinary bladder.
2. Levator ani.
3. Pubo-vesical ligament and veins.
4. Urethra.
5. Levator ani, anal fibres.
6. Central point of perineum.
7. Alcock's canal.

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FEMALE PERINEUM. No. 4.
SECTION VI.